MADSEN **Octavus**

Evoked Potentials Analyzer

User's Manual

CE
0459

GN Otometrics

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Contents

1. Introduction 3
1.1 Applications of Octavus BERA 4
1.2 Intended use of Octavus BERA 5
1.3 About this manual 5
1.4 System requirements 5
1.5 Software installation 6
1.6 Inspection 6
2. The Octavus BERA Hardware 7
2.1 Responsibility of the manufacturer 7
2.2 Standards and safety 7
2.3 Installing the Octavus BERA hardware 10
2.4 Care and maintenance 11
2.5 Equipment failure 11
2.6 Service and repair 12
2.7 Fuse replacement 12
2.8 Power-up procedure 12
2.9 Calibration 13
3. General Description 14
3.1 Technical specifications 15
3.2 Putting the system into operation 17
3.3 Preparing the patient 19
3.4 Operating the Octavus software 20
4. Abbreviations 25
5. References 26
6. Index 27

1. Introduction

The Octavus Evoked Response Analyzer is the most recent addition to the comprehensive line of audiodiagnostic instrumentation from Madsen. Like all other Madsen instruments, Octavus BERA is a high quality, and easy-to-use instrument. Octavus BERA is a PC-based system which runs under Microsoft® Windows™, with its own access to a patient database, optionally with a standardized patient data interface such as GDT. In addition to the main unit containing the hardware, Octavus consists of separate software modules, this documentation and accessories.

Octavus BERA tests for auditory evoked potentials that are classified by their latency (time of occurrence after the stimulus) and filter settings of hard- and software. This unit is delivered with a software module that records early responses with a latency of up to 15 ms after the stimulus. The stimulus applied by this instrument is a click.

Octavus BERA is operated by an IBM or compatible personal computer via the built-in RS232 or USB connection via RS232 adapter, and offers the following unique features:

- The Octavus main unit (module)
- Windows-based software running under Windows 98 (Second Edition), Windows Millennium (ME), Windows NT 4.0, Windows 2000 and Windows XP.
- Electrode cables and connectors
- Air conductor(s) for stimulation of the auditory system
- Ag/AgCl disposable electrodes with wet gel electrolyte. Other electrodes are optional
- Abrasive skin preparation paste
- Optional use of transducers other than air conductors, such as insert phones.

1.1 Applications of Octavus BERA

Octavus BERA is designed to read tiny voltage differences from the skull (biosignals, similar to signals visualized in an electroencephalogram (EEG)) after excitation of the auditory system. These biosignals are sensed by electrodes placed on the head of the patient at positions behind the ears, on the forehead, and a neutral electrode at a somewhat arbitrary position (on the cheeks, or on the collarbone, for instance). As the stimulus in BERA testing is sound (mostly clicks), the more general name for these potentials is Auditory Evoked Potentials (AEP) or Electrical Response Audiometry (ERA). Potential differences measured from the skull are amplified, transferred to a PC and displayed. When auditory evoked potentials are present, a typical wave pattern emerges and certain waves can be identified.

Early evoked potentials (commonly referred to as BERA or ABR) have an amplitude of several hundreds of nanovolts (10^{-9} V), up to some micro-volts (µV) at maximum.

The electrodes are positioned on the mastoids (positions M_1 and M_2) and Vertex (C_z), the uppermost position on the skull. For practical reasons the forehead (F_{PZ}) is most commonly used instead of the vertex position.

In a 1-channel BERA recording, the mastoid electrode, when placed behind the ear in the contralateral position to the stimulated ear, serves as neutral electrode, and vice versa, by switching operation by the biosignal-amplifier. Fig.1 shows that the left ear is stimulated and potential differences between the left Mastoid electrode (M_2) and the Vertex electrode (C_z) are recorded. The Mastoid electrode at the non-stimulated ear serves as a neutral electrode (N, in Fig. 1).

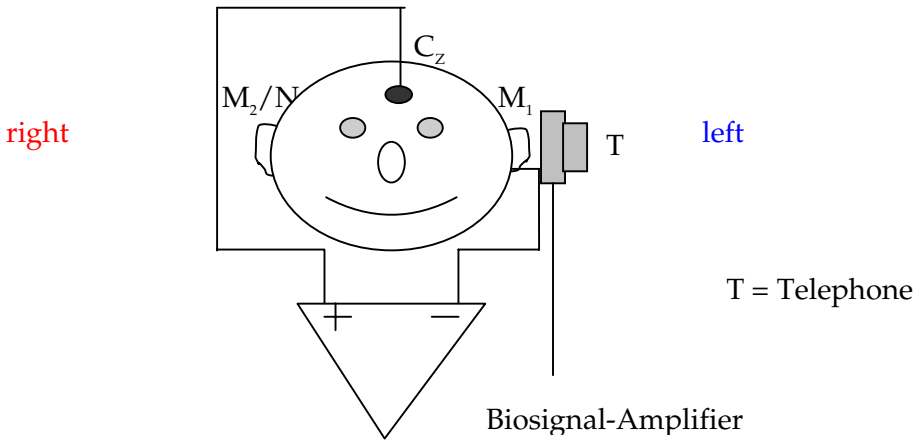


Fig 1: Schematic presentation of a BERA recording (1-channel recording only)

1.2 Intended use of Octavus BERA

This manual is intended to explain operation of Octavus BERA to trained users, audiologists, audiological assistants and medical doctors working in the field of audiology. Octavus BERA is intended for

- Identification of retro-cochlear disorders (Topodiagnosis) such as the detection of vestibularis schwannoma or acoustic neurinoma.
- Differentiatial diagnosis. Differentiation between conductive, retrochochlear and cochlear hearing loss.
- Determination of hearing thresholds using click stimuli.

1.3 About this manual

It is assumed that the user group referred to in § 1.2 has sufficient knowledge about auditory evoked potentials. Therefore, only measures and steps essential in ensuring a safe and effective operation of the Octavus are described in this manual. However, you are welcome to refresh or expand your knowledge by attending GN Otometrics' seminars on ABR testing.

The Windows-based application software of Octavus BERA provides for user-friendly operation of Octavus BERA. The screen layouts together with the Online Help make the program easy to use (for accessing the Online Help press the F1 key when you use the software).

This manual describes Octavus BERA's hardware, accessories and software, and also includes short operating instructions on how to use the software. Familiarity with Windows is assumed.

1.4 System requirements

Recommended:
IBM-compatible PC with the following:

- 128 MB RAM (minimum)
- Microsoft Windows 98SE, Windows Millennium (ME), Windows2000, Windows NT 4.0 SP6, Windows XP
- Pentium processor > 450 MHz (minimum)
- Mouse
- Windows-compatible printer
- 1 free COM port or 1 free USB port (minimum)
- Screen resolution 1024 x 768.

1.5 Software installation

The software is supplied on a CD at the back of this User's Manual.

To install Octavus BERA on your PC, do follows:

1. Insert the CD into your CD drive.
2. The installation program starts by itself when you insert the CD. If it does not, run **setup** from the Octavus CD.
3. Select the language version you wish to install. Click **Next**.
4. Windows starts the installation program. Follow the instructions on the screen. The Octavus BERA PC program, databases and Online-Help are installed on your hard disk or in your network. On Windows 98 SE systems the program "Windows Installer" is installed prior to installation of the Octavus BERA program.
5. You can select a network drive to install the database on a server in a network. The default directory is C:\Programs\Madsen\Octavus BERA. You can specify another data path in the installation dialog.
6. You can simplify start up by creating a short cut to Octavus BERA on the Windows desktop.

Depending on which operating system you are installing to, the installation program may require that you reboot your PC.

1.6 Inspection

Please visually check all shipped parts. If there are damaged parts or if you are in doubt with regards to the proper functioning of parts, please immediately notify the carrier and your supplier.

If the shipping carton is visibly damaged upon delivery, ask the carrier's agent to be present when the instrument is unpacked. If the instrument is damaged or fails to operate, please notify the carrier and your GN Otometrics representative immediately. Your GN Otometrics representative will arrange for the repair or replacement of the instrument prior to settlement of any claim against the carrier.

Please keep and store the shipping carton in case you need to return the instrument to your GN Otometrics representative or to the factory for service or repair.

2. The Octavus BERA Hardware

2.1 Responsibility of the manufacturer

The manufacturer reserves the right to disclaim all responsibility for the operating safety, reliability and performance of equipment serviced or repaired by parties not authorized by GN Otometrics. Following repair, the safety of all equipment should be verified by a person authorized by GN Otometrics.

The manufacturer is to be held responsible for the safety, reliability, and performance of the equipment ONLY IF

- All assembly operations, extensions, re-adjustments, modifications or repairs are carried out by personnel authorized by the manufacturer
- The electrical installation to which the equipment is connected is earthed
- The equipment is used in accordance with the instructions for use.

2.2 Standards and safety

This class of equipment is allowed in domestic establishments when used under the jurisdiction of a health care professional. Only persons who have read and understood this User's Manual are entitled to use this instrument. No other medical equipment is to be used in the patient vicinity during operation of the Octavus BERA system.

Standards
Octavus BERA complies with the following standards:

EN60601-1	general requirements for safety:
EN 60601-1-1	Safety of Systems
EN 60601-1-2	EMC (electro-magnetic compliance)
EN 60645-3	Auditory test signals of short duration for audiometric and neuro-otological purposes.

2.2.1 Safety Symbols

This User's Manual contains information and warnings which must be followed to ensure the safe performance of the Octavus BERA evoked potentials instrument. Local government rules and regulations, if applicable, should also be followed at all times.

Special note should be made of the following:

Symbol	Description
	Octavus BERA is marked with this symbol when it is important that the user refers to associated warnings given in this manual. Please pay special attention to these warnings. The symbol may be followed by a number to indicate a specific reference.
	Octavus BERA is marked with this symbol to indicate compliance with Type **BF (body floating)** requirements acc. to **EN 60601-1: F-type isolated (floating) applied part:** *Applied part* isolated from other parts of the *Equipment* to such a degree that no current higher than the *Patient leakage current* allowable in *Single fault condition* flows if an unintended voltage originating from an external source is connected to the *patient*, and thereby applied between the *Applied part* and earth.
CE XXXX	Octavus BERA evoked potentials analyzer is CE-marked according to the Medical Devices Directive 93/42/EEC.

2.2.2 Safety precautions

Octavus BERA has been designed and tested in accordance with EN 60601-1 "Safety of Medical Electrical Equipment". To ensure safe performance, Octavus BERA must be correctly installed and the following safety requirements must be complied with.

Warning notes:

- Grounding continuity should be checked periodically
- Operating at the wrong voltage may blow the fuses! Make sure that supply voltage is either between 100-120 V or 200-240 V
- When assembling an electro-medical system, the person carrying out the assembly must take into account that other connected equipment which does not live up to the same safety requirements as this product may lead to a reduction of the overall safety level of the system
- **WARNING!** When replacing the fuses (see 2.7) there is a **risk of fire**. For continued protection against fire hazard, replace fuses with the same type and rating only.

When selecting accessories connected to the RS232 socket, the following points must be considered:

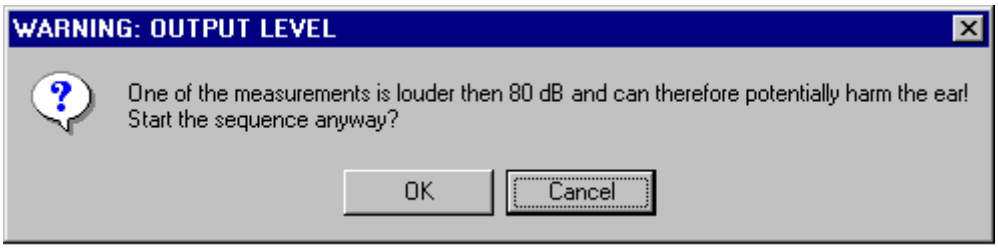
- Use of connected equipment in a patient environment.
- Proof that connected equipment has been tested in accordance with EN 60601-1 and /or EN 60601-1-1 and UL2601-1 and CAN/CSA-C22.2 NO 601.1-90.

Do not plug anything into the mini-DIN connectors and the connector labeled 'BC' at the rear of the instrument.

The bone conductor cable and the insert phone (E-A-RTONE 3A) cable are not to be removed or tampered with while connected to the Octavus main unit. Either disconnect the bone conductor entirely from the instrument, or ensure that the instrument itself is disconnected from the mains.

In addition, please pay attention to the following:

- Use only the original power cable supplied with Octavus BERA (an approved 3-pole mains plug).
- Octavus BERA must only be connected to an AC power outlet which has a protective earth conductor.
- Conductive parts with patient connection must not be in contact with other conductive parts at any time. No defibrillators must be applied to the patient when connected to Octavus BERA at any time. When using HF surgical equipment, avoid hazards in the form of burns.
- The connectors for all headsets are identical. Therefore, it is important to ensure that each headset is plugged into the appropriate connector.
- Stimulus levels above 80 dB HL (approx. 115 dB peSPL) might cause damage to the hearing of patients who have been exposed to high sound pressure levels or undergone surgery recently. The software issues a warning note before applying levels above 80 dB HL:


WARNING: OUTPUT LEVEL
One of the measurements is louder then 80 dB and can therefore potentially harm the ear!
Start the sequence anyway?
OK
Cancel

  Please reconsider the patient's audiological status before confirming the warning note and applying the stimulus.
- Unwanted electrical interference may occur if Octavus is exposed to a strong radio field, and such noise may interfere in the process of recording a correct evoked reponse. Many types of electrical device such as mobile telephones, PC monitors (excluding TFT-Monitors) as well as fluorescent lamps may generate radio fields. We recommend that the use of such devices in the vicinity of Octavus BERA be restricted as much as possible.
- The quality of the measurement depends crucially on the type of electrodes used. If you have any questions regarding the type of electrodes to use, please contact your local GN Otometrics distributor for information on electrodes suitable for ABR testing.
- Wet gel electrodes tend to dry out. Before each test, inspect the electrolyte cushion and check if it is still wet. Do not open electrode packets before you use them. Only open one packet at a time. When ordering large amounts of electrodes make sure that all electrodes are likely to be used before their expiry date. After the date of expiry has been exceeded, electrodes must be discarded.
- Octavus BERA is NOT suitable for use in the presence of flammable anaethestics (gases).

2.2.3 Storage and shipment

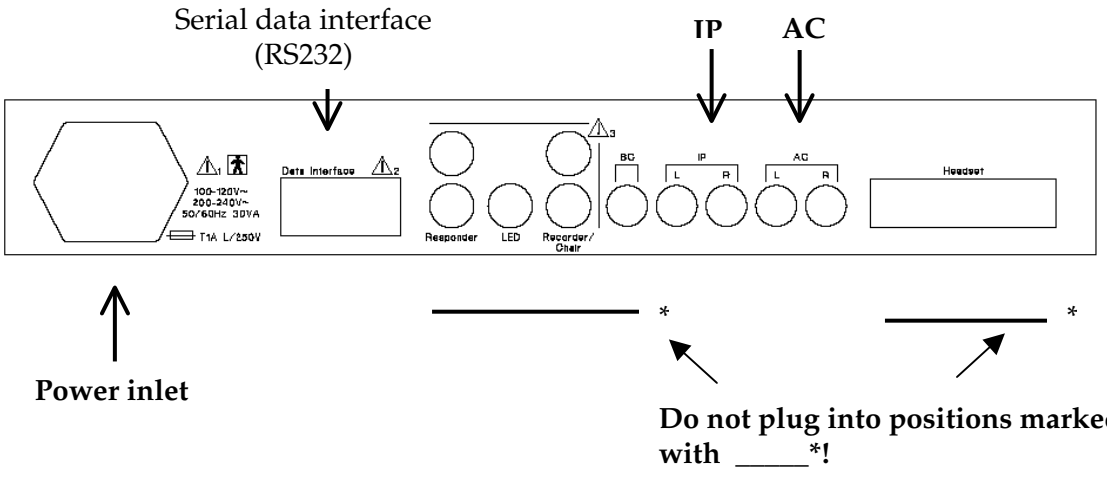
To protect the instrument and accessories during storage or shipment, for instance if you send the device in for service or repair, always use the original shipping cartons.

2.3 Installing the Octavus BERA hardware

2.3.1 Installation

Locate Octavus BERA in a clean, dry and well-ventilated room away from all liquids and sources of heat and electrical fields (see section 3.1.3). A sound-treated booth is not necessary but testing is facilitated by a moderately quiet room. Avoid electrical interference wherever possible.

- Make sure Octavus is powered OFF.
- Plug the patient cable into the socket on the front panel of the instrument. Connect the patient cable with the electrode connector to in the socket labeled Electrode Input.
- Connect outputs (e.g. an air conductor) in the appropriate sockets ("AC" for air conductors). If you operate other transducers than air conductors, plug in insert phones in the IP socket (insert earphone). Make sure that you select the correct socket!
- Before you connect the power cable, make sure that the voltage from the electrical outlet matches the voltage shown on the identification label placed next to the power inlet. *First* plug the power cable into Octavus and *then* into the mains.
- Switch the Octavus module on and wait until the COM - LED stops flashing.
- Make sure that your PC has booted correctly.
- Connect the serial line connector from the connection panel at the rear of Octavus BERA to (Data interface) the COM port of your personal computer, (see Fig. 2). If your PC does not have a COM port, use an RS232-USB converter.



Legend:
IP: insert phone
AC: air conductor
BC: bone conductor

Fig.2: Octavus rear side

For further steps and the preparation of patients see section 3.2 and 3.3.

2.4 Care and maintenance

Always make sure that electrode cables and acoustical outputs (air conductors or insert phones), which are in constant contact with your patients, are kept clean.

Cleaning non-disposables that are in regular contact with the patient:
Regularly wipe non-disposable parts that may be in contact the patient, such as electrode connectors, electrode cables, patient cable and acoustical outputs with a soft cloth with a mild detergent. Make sure that the surface of these parts is dry after cleaning and transducers are not damaged.

Note that disposable electrodes cannot and must not be cleaned. Discard them after use.

Cleaning the main unit:
- Use a soft cloth or brush to remove dust.
- To clean, use a soft, slightly damp cloth with a small amount of mild detergent on it. **Make sure that moisture does not enter inside the instrument or onto the electrode cables!**

WARNING!
Chemical agents containing ammonia or alcohol will damage the cabinet.

- Do not expose the instrument to direct sunlight, and keep it well ventilated at all times to prevent overheating.
- Please uncurl cables occasionally as these tend to get worn or damaged. If you notice a damage to a cable, discard the cable to prevent that the biosignal-amplifier is damaged.

2.4.1 Disposables

Use Neuroline Ag/AgCl wet gel electrodes for single use, or alternatively Ag/AgCl electrodes (alternative wet gel, solid gel or cup-electrodes) for evoked response audiometry.

Foam eartips for the insert phones must be used only once.

2.4.2 Disposal

There are no special requirements for disposal of the electrodes, i.e. they may be disposed of in accordance with local regulations. Dispose of foam eartips for insert phones according to local regulations.

2.5 Equipment failure

If you believe the correct function or operating safety of Octavus BERA to be impaired in any way, disconnect it from the power supply and secure it against further use.

CAUTION: Under no circumstances remove the top cover of the main hardware unit! Contact your supplier.

2.6 Service and repair

Service and repair of electromedical equipment should be carried out only by the equipment manufacturer or by authorized representatives. There is a risk of electric shock if the device is opened while switched on.

2.7 Fuse replacement

Two identical fuses (5 x 20, T1A L/250 V) are located below the power inlet. Both fuses are required for the operation of the Octavus BERA. To replace a fuse, do as follows.

1. Disconnect Octavus BERA from the mains/line power supply.

2. Use a small screwdriver to press down the clip in the middle of the black plastic fuse holder and extract the holder from the fuse compartment.

3. When it is loose, extract the holder and change fuses—refer to the fuse specifications marked above the Power switch.

4. When loose, extract the holder and change fuses—refer to the fuse specifications marked above the Power switch.

WARNING! Risk of fire. Replace fuses as marked.

4. Remount the fuse holder by pushing it firmly into place—an audible click can be heard (the holder cannot be inserted back to front).

2.8 Power-up procedure

Power on Octavus BERA by pressing the power switch on the right hand side of the front panel. The start-up process is as follows: on power-on, the Power LED (see Fig. 3 for a schematic view) lights green, and a brief system test is made. The PC Com LED lights green, indicating that Octavus BERA is ready for communication with your PC.

If you try running your Octavus without powering it on, you will be advised on-screen of a timeout error. Power off Octavus BERA, wait a few seconds and repeat the power-on procedure.

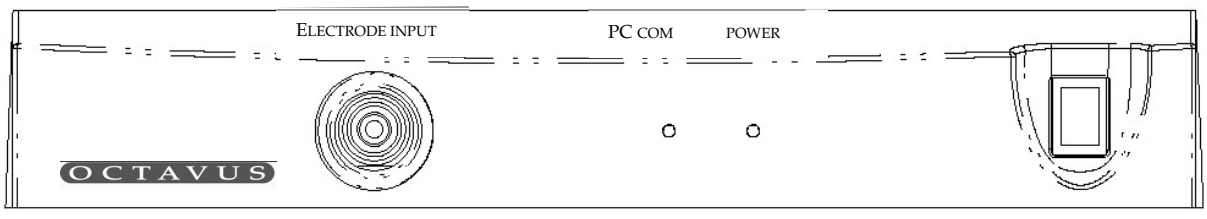


Fig. 3: Octavus front view

2.9 Calibration

Re-calibration should be performed annually by suitably qualified personnel.

Your Octavus BERA was dispatched from the factory together with a Test Report (Calibration Certificate). The Test Report specifies which transducers have been calibrated (i.e. those which have been supplied together with the instrument), according to which standards, and what equipment was used for calibration. Results are listed for each transducer at all standard frequencies.

Calibration has been performed according to the applicable norms cited in the References section, § 6.

Sound pressure levels for ABR instruments are regularly specified in dB HL (HL= Hearing Level). The physical unit for sound, SPL (Sound Pressure Level) is converted into dB HL units using conversion tables.

Before first use, download the calibration file shipped with the transducer to the PC using the transducer installation utility in the Octavus Software.

CAUTION: Make sure that the transducer you have selected in the PC software in the configuration program corresponds with the transducer in use. When you select another transducer, make sure that you have installed the corresponding calibration file and selected the current transducer in the transducer configuration program (in the **Extras** Menu). Incorrect calibration may lead to deviations of stimulus levels relative to the set level.

3. General Description

The Octavus BERA auditory evoked potentials analyzer is an audio-diagnostic instrument designed to measure tiny potentials elicited by acoustical stimuli such as clicks. The Octavus BERA setup consists of the following:

1. The hardware platform Octavus, which houses the power supply and printed circuit boards for signal generation, pre-amplification and pre-processing of input biosignals.

2. Patient cable, leading to the electrode input connector, with an 8-pole DIN plug to the main unit (i.e. hardware platform) and to 4 (3) electrode cable outlets to the patient's side (for 2 (1) -channel operation). A CAS clip can be used to fix the electrode input connector to the patient's clothes.

3. Electrode cables leading to the electrodes with a 2 mm safety plug, to be plugged into the "electrode input connector" (see Figs.4a and 4b in §3.2.1).

4. Disposable electrodes .

5. Air conductor and cable, and jack plugs, e.g. of type Holmco 95.01, including calibration file on diskette.

6. Skin preparation gel.

7. Electrode cable test adapter "MADSEN".

8. This User's Manual with a PC software CD including Online Help.

9. RS232 computer interface cable.

10. Fuse kits.

11. Quick Guide.

Some test parameters are preprogrammed and stored in nonvolatile memory on the printed circuit boards of the main electronics unit. These parameters are retained when the power supply is cut-off, but can be reprogrammed or upgraded from a personal computer by authorised personnel as necessary. You can select other test parameters from the computer using the keyboard or various function keys.

The hardware platform has two LED displays indicating power on, and signal and response transmission (PC Com).

3.1 Technical specifications

3.1.1 Technical data sheet

Outputs/ transducers

Stimulus:	0-100 dB HL adjustable in 10 dB-steps
Contralateral masking:	Adjustable in 10 dB steps, relative to stimulus; default preset
Stimulation rate:	8, 16, 20, 24, 32 Hz; default: 20 Hz
Time window (measurement time):	Up to 15 ms, adjustable
Main unit - PC interface:	Control of RS232/ RS232-USB interface
Air conductor (AC):	Holmco 95.01
Insert phones, optional:	E-A-RTONE 3A, max. output level approx. 85 dB HL; 120 dB SPL

Biosignal input

No. of channels:	2, 1 Channel can be deactivated
Gain:	114.5 dB
Resolution voltage:	0.63 nV
Amplitude range:	0.63 nV – 63 µVpp
CCMR:	110 dB (lin. 316.000)
Sampling rate:	40 kHz
Time resolution:	0.025
High pass filter:	160 Hz, adjustable
Low pass filter:	4 kHz
Notch Filter:	50 Hz
Input impedance:	30 Mohm
Impedance test of electrodes:	Separate impedance reading for each *active* electrode, software-controlled;
Artefact control:	Integrated

Packaging

Housing:	Plastic housing around a metal chassis
Plug positions:	Outlet for headsets on rear panel Electrode input on front panel
Plugs:	9-Pin SUB-D connector for RS 232 Jacks for insert phone
Weight (OCTAVUS main module):	Approx. 2.5 kh, 5 lbs
Dimensions :	335 x 320 x 60 mm (WxBxH)
Input voltage:	100-120V 200-240 V// 50/60 Hz
Power consumption:	Less than 60 VA
Power up process:	Warm-up time: less than 2 min.

3.1.2 Patient Safety

Complies with EN 60601-1, Class I, Type BF, IPX0
EN 60601-2-26 Norm for electroencephalographs
EN 60601-2-40 Norm for evoked potentials.

3.1.3 Operating Environment

Mode of operation:	Continuous
Temperature:	10° - 35°C
Relative Humidity:	Less than 95 %, non-condensing
Atmospheric Pressure:	600 - 1090 hPa

Operation in temperatures exceeding –20°C or +60°C may cause permanent damage.

3.1.4 Storage & Shipment Environment

Temperature:	– 20°C to +60°C
Relative Humidity:	Less than 95 %, non-condensing
Atmospheric Pressure:	500 - 1090 hPa.

3.1.5 Electro-magnetic compliance (EMC)

EMC Emission and Immunity: Complies with EN 60601-1-2.

3.1.6 Standards

Audiometer EN 60645-3.

3.1.7 Type identification

Octavus BERA is type 5000 from GN Otometrics A/S.

3.2 Putting the system into operation

3.2.1 Data acquisition part: Set up of electrode cables

Fig. 4a shows a single electrode cable with a clip plug for the electrodes to snap into and a DIN safety plug for the electrode cable connector (see the black cable bases in Fig. 4b, right). Push the DIN connector firmly into the plug of the connector to ensure electrical contact between cable and connector.

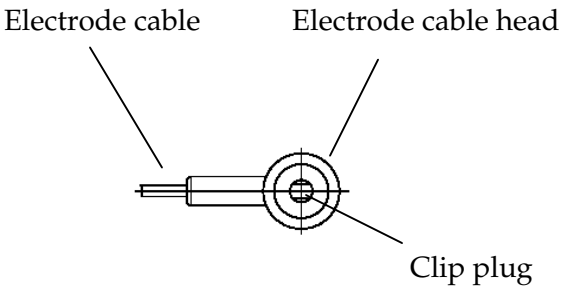


Fig. 4a: Electrode cables with clip plug

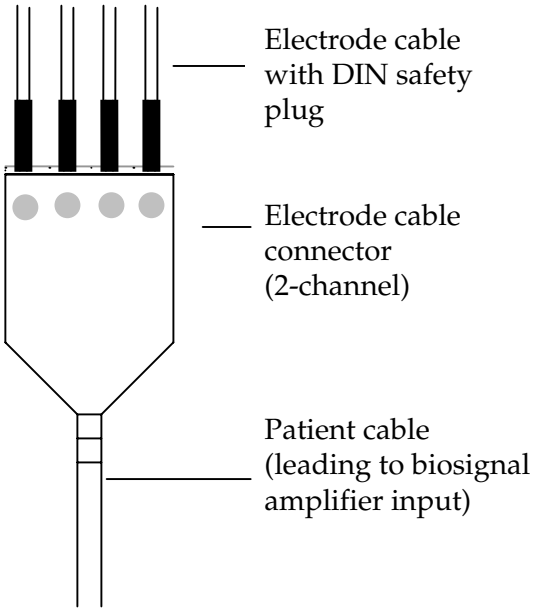

Electrode cable with DIN safety plug
Electrode cable connector (2-channel)
Patient cable (leading to biosignal amplifier input)

Fig. 4b: Electrode cable connector (2-channel) with DIN safety plugs

Note: Electrode cable connectors are different for the 1-channel and the 2-channel versions.

The 1-channel connector has only 3 plugs for electrode cables:

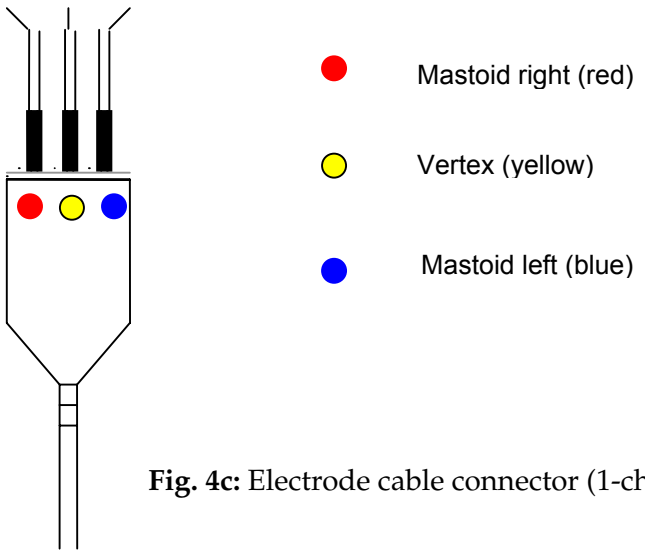


Fig. 4c: Electrode cable connector (1-channel)

The 2-channel connector has 4 plugs for electrode cables:

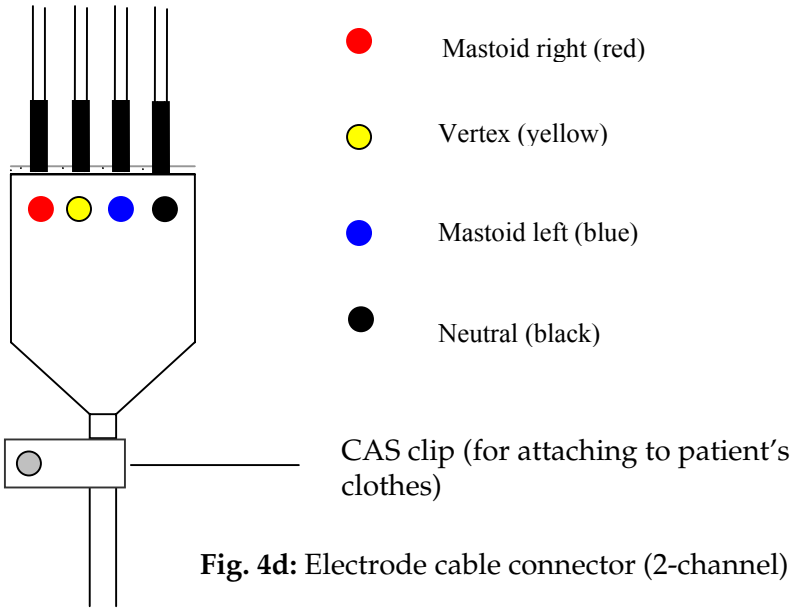


Fig. 4d: Electrode cable connector (2-channel)

Make sure the patient cable with the electrode connector is plugged into the main unit at the front.

3.2.2 Plugging outputs

Plug in outputs/ transducers on the rear panel of the Octavus main unit. Plug in

- Air conductors in the AC port
- Insert earphones in the IP port
- Download calibration data for the transducer you use from the supplied diskette: Select the **Extras** Menu in the Octavus software (refer to the Online Help or § 3.4).

CAUTION: Make sure the transducer you have selected in the PC software in the configuration program corresponds to the transducer in use. When you select another transducer, make sure you have downloaded the corresponding calibration file and selected the current transducer in the configuration program.

Incorrect calibration can lead to deviations in stimulus levels relative to the set level.

3.3 Preparing the patient

Before you start, explain to the patient what the test is all about and that she/he need not worry as BERA testing is non-invasive and harmless. For the test to be successful, the patient must be relaxed, and muscle tension in the neck must be avoided. The more relaxed the patient is the better.

- Prepare the skin of the patient with the skin cleaning paste at the positions marked in Fig. 5.
- Connect the electrodes to the electrode cables using the "clip plugs" and apply the electrodes at the positions as marked in Fig. 5. Make sure that each electrode is applied to its correct position as shown in Fig. 5 or an equivalent position.
- To avoid pull exerted by the electrode cables, you can fix the electrode cable connector to the patient's clothes using the CAS clip shipped with Octavus.

Yellow:	Vertex. Preferably on the forehead (Fpz), or on the topmost position of the head (after hair has been removed from this area)
Red:	Mastoid right (A_2/M_2)
Blue:	Mastoid left (A_1/M_1)
Black:	Neutral (N). Preferably at the collar bone, alternatively on the cheeks or on the back of the hand.

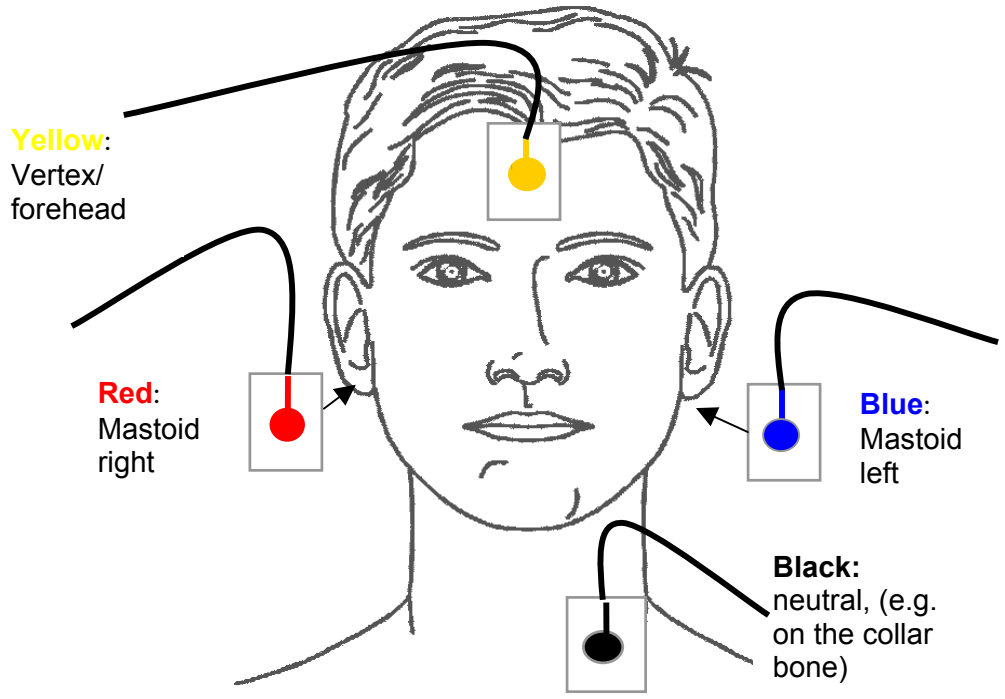
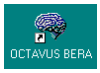


Fig. 5: Electrode positions (2-channel)

- Start a measurement program, i.e. the Manual Measurement Progam, or an Auto-Sequence. For further information please refer to § 3.4.2, to the Quick Guide or the Online Help.

3.4 Operating the Octavus software

To start the software, double click the Octavus BERA shortcut on the Windows desktop.

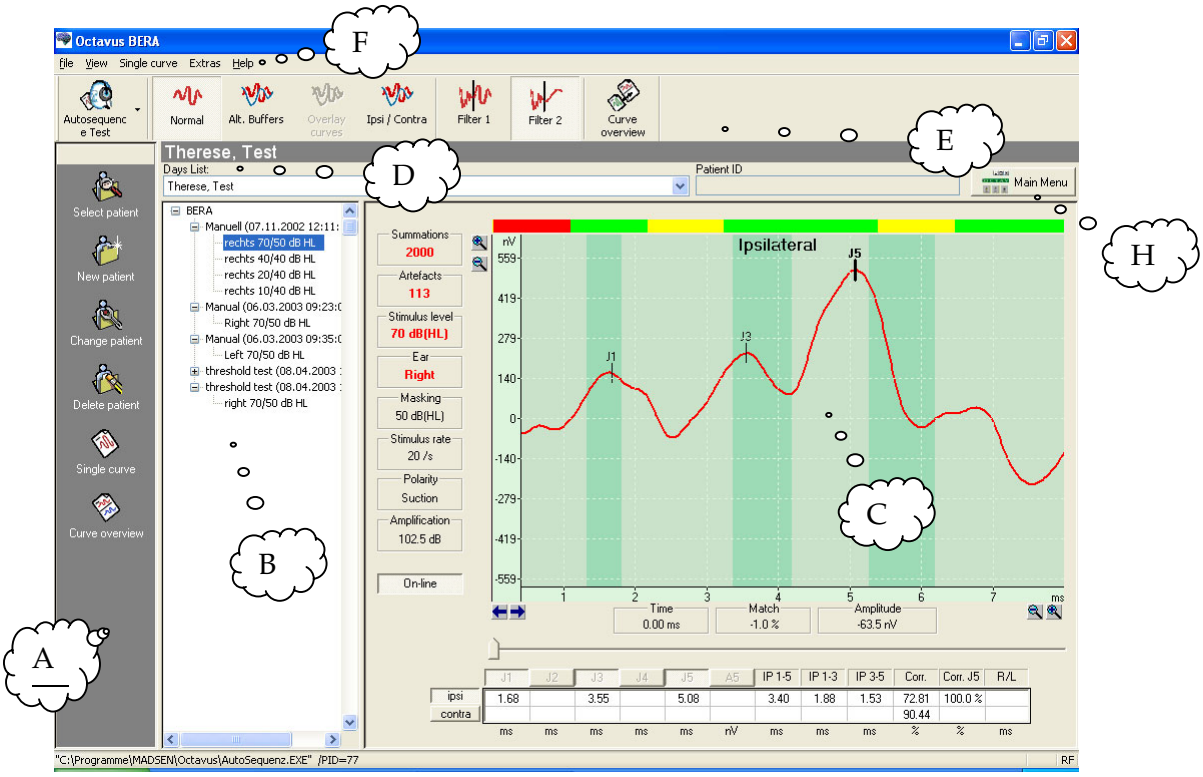


The Octavus BERA software is delivered with a comprehensive, built-in electronic assistant. Click on the Help Symbol to obtain answers to questions or problems you may experience when using Octavus BERA.

3.4.1 About the user interface

The Octavus Software contains various controls or sub-programs.

From the program bar (**A**) on the left, you can select functions by clicking on the icons displayed there.



Octavus Software: view of user interface in "single curve evaluation mode"

A

- **The program bar** SHOWS programs (functions) you can select. A single click on the icon launches the program/function, which is then shown in the center and right part of the screen.

B

- **The session view** shows all tests stored so far in the **Patient information control** in the database for the active patient. View tests by double clicking in the session view.

C

- The **active program window**. All data retrieved in the **program bar** (**A**) is shown here. A single BERA curve is shown here for evaluation. Use buttons and controls on and under the curve graphic to assign latencies (here: "single curve view")

D

- **Patient information control/Today's Patients"**. The active patient is shown here. If you wish to select another patient, click on the on the ▼ arrow to browse through patients who have been tested that day (**day list**). Note that data shown in the other areas of the screen now refers to the new patient selected.

E

- The **toolbar** reflects the active program selected in the **program bar** and contains the buttons, which access functions that are frequently used. These functions can also be found in the drop-down menus of the
Menu bar.

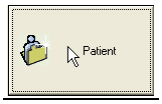
  Pressing the **Measure Button** allows you to run new tests (**session**) with the same patient.

F

- The **Menu bar** like the **toolbar**, reflects the active program selected in the **program bar**. For instance, functions relating to testing only appear when a test program is selected, but disappears when one of the patient related applications such as **New patient** or **Delete Patient** is active.

H

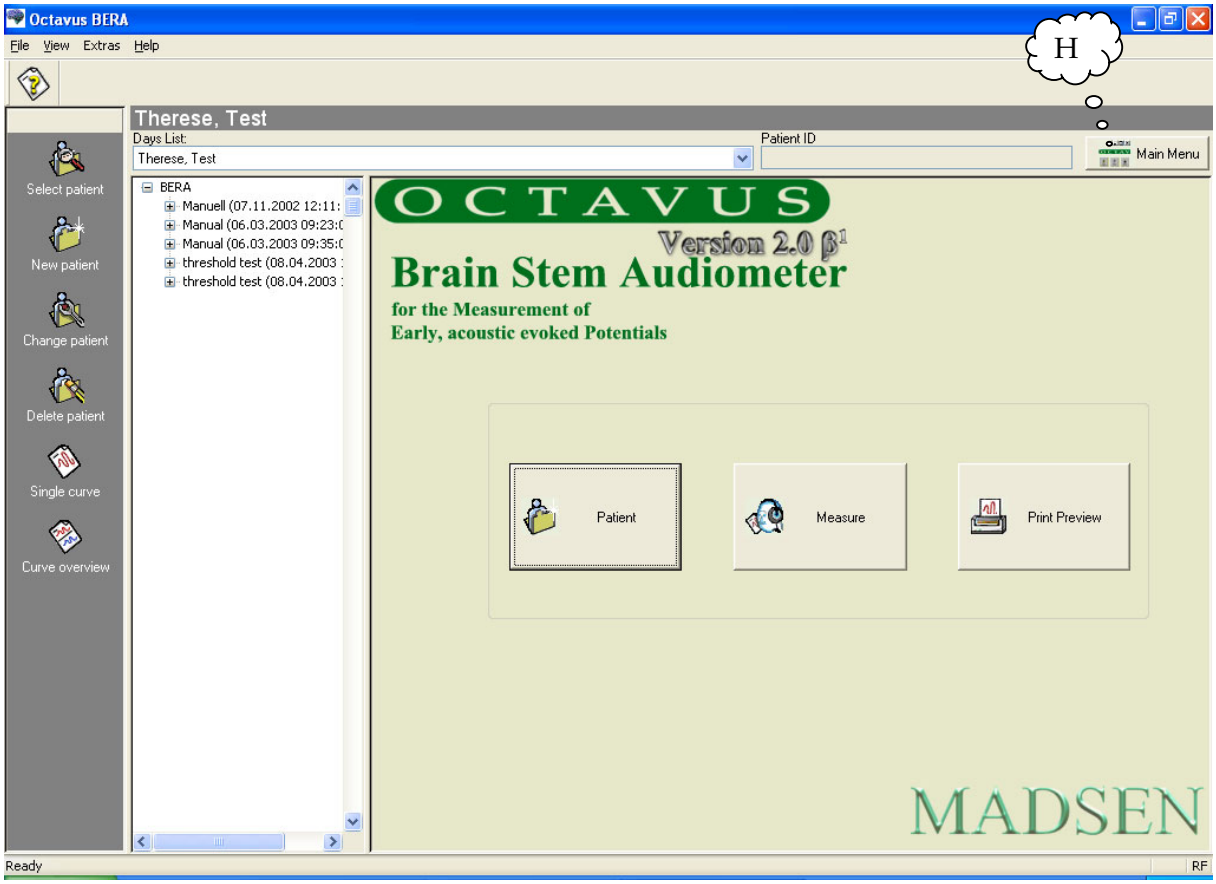
- As a quick alternative to the program bar, select the **Main menu** (H) to:



Edit patient data (default setting)

Run a test (e.g. an Auto-Sequence, default setting)

Edit/print test results



Octavus Software: Main menu screen

Customisation:

You can customise the names and functions of the three buttons. Select **Main menu** > **Options** > **Shortcut buttons**.

Access the Online Help (press **F1**) for information on how to customize the buttons.

3.4.2 Running tests using the measurement program

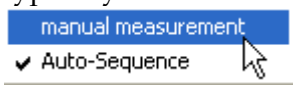
The Octavus offers a Manual and an Auto-sequences measurement program.

You can move the measurement program window (**G**) to any part of the screen. It resembles a remote control for controlling test conditions during an ABR measurement.

- To start the Manual Measurement program, click the button

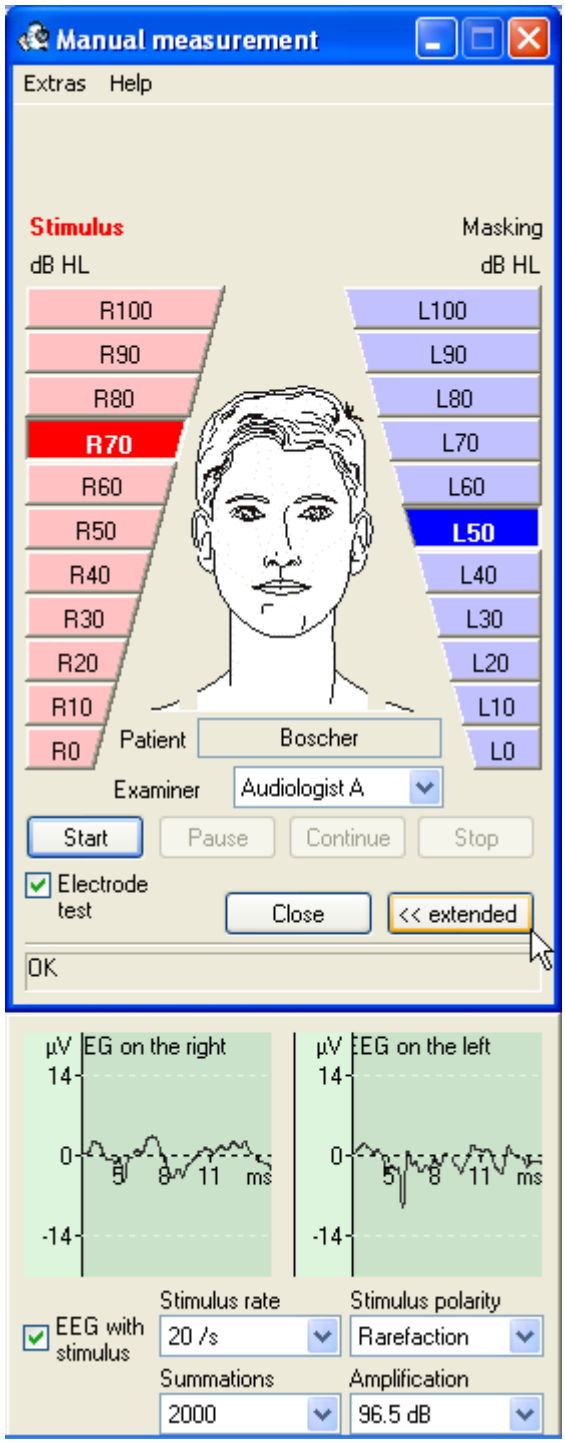
in the program bar.
- Then click the -button. This button will start the measurement program (Manual Measurement or Auto-Sequences) most recently used.

If you do not wish to run the type of test indicated on the button, click on the bottom part of the measurement button, and the alternative button pops up in a small drop-down menu. Select the test type of your choice:



Alternatively, just press the button from the **Main menu**.

Upon start you will hear a click indicating that a connection between your PC and the Octavus is established.



Octavus Software: Manual Measurement window

For further help with the Octavus software, click on **Help** > **Octavus Online Help** from the menu bar, or the button.

The online help contains a table of contents, an index and a search function.

To acquire help when you use the Octavus software, press the **F1** key or access the Online Help from the **Help** menu.

The Online Help is context sensitive, which means that you enter the help file where it refers to the program part you are currently using and most likely require information on.

4. Abbreviations

AC	Air Conduction *or* Air Conductor
ABR	Auditory Brainstem Response
AC	Alternating Current
AEP	Auditory Evoked Potentials
AUTO	Automatic
BERA	Brainstem Evoked Response Audiometry
CD	Compact Disk
DC	Direct Current
EEG	Electro Encephalo Gram
EMC	Electro Magnetical Compliance
ERA	Evoked Response Audiometry
EXT	External
GDT	Geräte Daten Treiber (German)
HL	Hearing Level
L	left (ear)
PC	Personal Computer
R	Right (ear)
USB	Universal Serial Bus
V	Volt(s)
µV	micro (10-6) Volt(s)

5. References

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S. Hoth & Th. Lenarz. 1994. Elektrische Reaktions-Audiometrie. Springer Verlag Berlin, Heidelberg, New York.

U. Richter. 1988. Characteristic Data of Sound Transducers used in Audiometry (MA-27). Physikalische Bundesanstalt, Braunschweig und Berlin).

Standards:

ISO 389: 1991. Acoustics. Standard Reference Zero for the Calibration of Pure-Tone Air Conduction Audiometers

EN 60645-3: 1994. Audiometers – Part 3: Auditory Test Signals of short Duration for Audiometric and Neuro-otological Purposes

6. Index

biosignal-amplifier 4
Calibration 13
Calibration Certificate 13
COM port 5
data path 6
Determination of hearing thresholds 5
disposable electrodes 14
Disposal 11
electrocephalogram 4
Electrode cable test adapter 14
electrode cables 14
Electrode cables 17
electrode input connector 14
electro-magnetic compliance 7
EMC 16
Evoked Response Analyser 3
grounding 8
hardware platform 14
hearing level 13
HL 13
Inspection 6
main menu 21
measurement program 23
Medical Devices Directive 93/42/EEC 8
Menu bar 21
Microsoft® Windows™ 3
Norm for electroencephalographs 16
Norm for evoked potentials 16
Octavus Software 20
Online Help 24
Operating Environment 16
patient database 3
Patient Safety 16
PC monitors 9
PC software 14
Power-up procedure 12
Preparing the patient 19
program bar 21
Quick Guide 14
retro-cochlear disorders 5
Safety of Medical Electrical Equipment 8
Safety Precautions 8
Safety Symbols 7
shipping carton 6
sound pressure level 13
SPL 13
Standards 16
Storage & Shipment Environment 16
Storage and Shipment 9
Technical data sheet 15
Test Report 13
Today's Patients 21
USB port 5
Windows XP 5
Windows2000 5